

DESCRIPTION OF A NEW SPECIES OF DEER, *CARIACUS CLAVATUS*, FROM CENTRAL AMERICA.

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In Messrs. Salvin and Godman's *Biologia Centrali-Americana*, Alston enumerates four species of deer as inhabitants of the region between Texas and the Isthmus of Panama. These are *Cariacus macrotis* (Say), *Cariacus virginianus* (Boddaert), *Cariacus toltecus* (Saussure), *Cariacus rufinus* (Bourcier et Pucheran). Of these, the first three belong to the subgenus *Cariacus*, as defined by Sir Victor Brooke, and the fourth to the subgenus *Coassus*.

It is now my intention to add to the list of Central American deer a fifth species, which, as I shall presently show, presents a superficial resemblance to the species of the subgenus *Coassus*, but belongs in reality to the subgenus *Cariacus*.

The description is based upon a good series of specimens in the National Museum, including young and adult individuals of both sexes. The species never acquires branched antlers, and I have therefore chosen for it the name of *Cariacus clavatus*.

DESCRIPTION OF *CARIACUS CLAVATUS*.

Stature medium; antlers simple spikes, directed backwards nearly in the line of the face. In general appearance and color like *C. virginianus*. A small metatarsal gland present. Hoofs yellowish at the extremity.

*Male, young, summer pelage.*—General color bright chestnut. Head grayer than the back. A white spot on each side of the rhinarium, succeeded by an oblique dusky-brown band, which reaches from the nostril to the margin of the upper lip, and is continued by a spot on the margin of the lower lip. Behind the dusky band is one of whitish gray, which is merged into dark gray posteriorly. The latter color is strongly tinged with chestnut on the cheeks, temples, and forehead. The median line of the face is occupied by a dusky-brown band, which extends backwards nearly to the line of the eyes. The forehead is occupied by a broad crest of long reflexed hairs, which in the mass are darker than those of the face. The individual hairs are brownish-gray at the base, darker near the tip, where this color is succeeded by a ring of light yellow, more or less reddish; the tips of the hairs are dusky brown. There is a whitish-gray ring around the eye, conspicuously lighter than the gray of the face.

The outer surface of the ear is for the most part gray, but there is a rather large area of nearly pure white at the base of the posterior free margin, and another smaller area at the base of the anterior margin.

The latter is continued inside the ear by a fringe of long white hairs, which grow shorter upwards and are replaced about the tip of the ear by short hairs, closely set. The posterior inner margin of the ear is clothed with short hairs which are more or less tawny at the base of the ear, but white at its tip. These characters are much less clearly observable in the summer coat than in the winter coat. In the former, the hair of the back of the ear is often entirely rubbed off, and the inner side is only scantily clothed.

The back is of a nearly uniform light chestnut or tawny color. The hairs are gray at the base and grow darker above. The tips are black, while between this color and the gray is a chestnut or tawny ring. On the flanks the basal half of the hairs is whitish and the distal half pale chestnut, without a black tip. The hair on the buttocks is the same, but is fully  $2\frac{1}{2}$  inches long.

The color of the tail above is tawny, like the back, but the hairs are dark brown in the basal half. The hair of the under side of the tail, the perinæum, the scrotum, the inside of the thighs, and the abdomen nearly to the navel, is long and pure white.

The tawny color of the flanks extends without interruption over the chest. The median line of the breast is dusky brown. The neck is pale grayish chestnut, the gray color being due to the fact that the gray of the lower part of the hairs is mingled with the color of the upper parts of the same.

The jaw and throat are white, except that there are, as already stated, two dusky brown spots on the margin of the lower lip.

The color of the upper surfaces of the body is continued on the legs. The proximal half of the inside of the fore legs is pure white; but distally there is little difference in the color of the inner and outer surfaces. The same is true as regards the distal half of the hind legs; the inside of the upper hind leg, however, is paler than the outside, but is not pure white.

The hairs of the tarsal gland are pure white; of the very small metatarsal gland, scarcely lighter than that of the surrounding tawny-gray area, so that this gland is only with much difficulty to be found.

*Male, winter coat.*—As in other species of *Cariacus*, the winter coat is gray instead of tawny, the general color being that commonly known as "pepper-and-salt." Behind the navel, as far as the penis, the color is tawny rather than pure white. The tarsal gland is surrounded by blackish hairs, but outside of these, anteriorly, there are some white hairs. The surrounding area is tawny-gray. On the upper side of the tail the hairs are all dusky brown at the base and tawny at the tip. Legs gray.

COMPARISON OF THE SKULL OF *C. CLAVATUS* WITH THAT OF *C. VIRGINIANUS*.

Compared with *C. virginianus*, the forehead of *C. clavatus* is flatter. The level is maintained as far as the proximal end of nasals, beyond

which it dips down, so that the nasal bones are more curved than those of *C. virginianus*. The skull is much deeper in front of the eyes in *C. clavatus* than in *C. virginianus*; the eyes are larger, the lachrymal bone also larger and its free margin more convex, while the lachrymal pit is shallower. The orbital processes of the frontal and malar, forming the back of the orbital ring, are much the broadest in *C. virginianus*, and are more transverse.

The pedicels of the antlers are directed upwards much more in *C. clavatus* than in *C. virginianus*. The tube of the exterior auditory meatus is much larger in the former than in the latter, and extends beyond the superlying ridge of the squamosal so that it is plainly seen upon looking down upon the skull from above. The tube of the internal meatus is also prolonged in *C. clavatus* and ends in a sharp point.

#### ANTLERS.

The antlers of young males of *C. clavatus* are simple, slightly curved spikes. The burr is small and moderately rugose. In a young individual from Tehuantepec, no. 9442, and in no. 14212 the antlers are more or less triangular in section. In the adult males, like no. 13038 from Costa Rica, the antlers are slightly lyrate, considerably compressed laterally, and sharply pointed. The burr, though broad, is in some cases not distinctly marked off from the beam, and the rugosities extend up the anterior surface of the latter along the basal two-thirds in antlers which are little worn. The right antler of no. 13038 is deformed, the beam being bent over backwards and downwards, so that the tip is on a line with the burr.

In no. 13040 the antlers are abnormal; the beams are straight, slender, and smooth, and are distinctly marked off from the burr, somewhat as in the Roebuck (*Capreolus*). In no. 14212 the antlers are of typical form, but the upper half has been worn perfectly smooth by rubbing.

#### DISCUSSION OF THE AFFINITIES OF *C. CLAVATUS*.

Were it not for the difference in age among the specimens now before me, it might be thought that they were merely the young of some known species with branched antlers. That such is not the case becomes evident upon examination of the skulls. In the largest male skulls the teeth are those of the second or permanent set, and the crowns of the same are well worn. Furthermore, the sutures of the base of the skull are obliterated by ankylosis and the pedicels of the antlers are much enlarged. There can be no doubt that this is the skull of an adult individual.

The condition of the teeth and of the sutures at the base of the skull is shown in the following table:

Catalogue number.	Sex.	Denrition.	Last tooth in position.	Condition of teeth.	Suture between basi-occipital and basi-sphenoid.	Suture between basi-sphenoid and pre-sphenoid.	Basi-cranial length.	Length of antler.
							mm.	mm.
13343	♂	Milk	{ m <sup>1+</sup> } { m <sup>1</sup> }	.....	Open	Open	166	None.
5133	♂	...do	{ m <sup>2+</sup> } { m <sup>2+</sup> }	.....	do	do	166	None.
22828	♂	...do	{ m <sup>3+</sup> } { m <sup>3+</sup> }	.....	do	do	195	51
13332	♂	Permanent	All	Unworn	Closed	do	223	96
13040	♂	...do	All	Slightly worn	do	do	224	63
14212	♂	...do	All	Moderately worn	do	do	225	100
13038	♂	...do	All	Well worn	do	Closed	234	104
13343	♀	Milk	{ m <sup>3+</sup> } { m <sup>3+</sup> }	.....	Open	Open	193	None.
22829	♀	...do	{ m <sup>3+</sup> } { m <sup>3+</sup> }	.....	do	do	194	None.
13485	♀	Permanent	All	Slightly worn	Closed	Open	202	None.

\* Nearly cut.

† Half cut.

‡ Almost in position.

§ Antlers diseased.

The question of whether *C. clavatus* may not be identical with some previously-described species having simple antlers merits more serious attention.

It must be taken into consideration at the outset that in dealing with species having simple horns we are debarred from employing one series of characters which are universally used in distinguishing between the different groups of deer with branched antlers, namely, those drawn from the form of the antlers themselves. While it is fitting, for example, that the species of *Dama* should be separated from the *Cervus* group, on account of the difference in the form of the antlers, if for no other reason, it will not, on the other hand, be logical to bring together into one group all species possessing simple antlers; for, on account of their very simplicity, these antlers lack tangible characters. We are forced, therefore, to turn to other parts to find the means of discrimination.

It is unquestionable, I believe, that our new deer belongs to the genus *Cariacus*, but the question as to which subgenus of the group it falls in remains to be answered. Our first inclination would be to place it in *Coassus*, on account of its lacking branched antlers, but, as we have just pointed out, it is unsafe to trust to this negative character. In fact, on account of other characters which we will now consider, *C. clavatus* can not be placed in that subgenus.



In Sir Victor Brooke's Revision of the Cervidæ,\* four subgenera of *Cariacus* are recognized. These are, *Furcifer*, *Blastoceros*, *Cariacus*, and *Coassus*. The first two of these groups I shall be obliged in the present connection to regard as sections of the subgenus *Cariacus*, for, aside from the form of the antlers, I find no tangible characters in

\* Proceed. Zool. Soc., London, 1878, pp. 883-928.

Brooke's diagnoses by which the species may be distinguished from those of *Cariacus*. The small amount of material which I have been able to examine seems to warrant such a disposition of them. *Coassus*, on the other hand, presents many characters which distinguish it from *Cariacus*. In Brooke's valuable diagnoses four differential characters may be found. These are as follows: In *Coassus* (a) the auditory bullæ are less inflated than in *Cariacus*; (b) the rhinarium is ample, as in *Crevelus*; (c) the facial profile is more arched than in *Cariacus*; and (d) the stature is small. In the first three of these characters our new species agrees with *Cariacus* rather than with *Coassus*. The fourth character, relating to stature, is perhaps scarcely worthy of consideration as a subgeneric distinction; it is a matter apparently correlated with the small size of the antlers. To bring together our new deer and the various species of *Coassus*, on account of their small size, would not be more logical than to approximate two large species merely on the score of their common magnitude.

Leaving size out of consideration, therefore, *C. clavatus*, judged by the diagnoses of Sir Victor Brooke, belongs in the subgenus *Cariacus*. I now desire to bring forward three additional characters which our new deer possesses in common with the known species of the subgenus *Cariacus* and which separate it from *Coassus*.

It is pointed out by Brooke that in the deer of the New World the vomer extends backward in the nasal cavity, dividing it into two completely separated compartments. Upon examining the vomer in the different species of the subgenus *Cariacus*, *C. virginianus*, *macrotis*, etc., I find that the posterior end of the superior horizontal plate, while it covers the presphenoid, does not extend over the suture between the presphenoid and the basisphenoid. The free posterior margin of vertical plate is falcate, and in old individuals the attenuated extremity of the same curves backward and touches, or actually grows into, the surface of the basisphenoid. In *Coassus*, on the contrary, the horizontal plate of the vomer extends back far enough to cover the suture between the presphenoid and basisphenoid, and the free posterior margin of the vertical plate is straight or only moderately emarginate. In *C. clavatus* the form of the vomer is that of *Cariacus*, and not of *Coassus*.

As a second distinguishing character, I find that in all the species of the subgenus *Cariacus* the osseous walls of the external auditory meatus are incomplete in the center behind, thus , while in *Coassus* the vacuity occurs much higher up, thus . In this, as in the last character, *C. clavatus* shows a relationship to species of the subgenus *Cariacus*.

The third character to which I shall call attention relates to the arrangement of the hair on the face. The matter of the arrangement of the hair, as Sir Richard Owen has somewhere stated, deserves more attention than it has thus far received. So far as my observations go, the style of arrangement is very constant in individuals of the same species, or in the species of a group. In all the Cats, for example, the hair on



the nose, in advance of the eyes, has the tips directed forwards. In all species of *Bovina* which I have examined the hair immediately bordering the muffle or rhinarium is reflexed, but that immediately behind has the tips directed forwards. In the horse, as is well known, there is invariably a long and very definitely marked "part" in the hair on the flanks, immediately in front of the hind leg. Examples of this kind might be greatly multiplied, but it may suffice in this place to say that, considering the constancy in the position and form of these "parts" and divisions of the hair, there is, I believe, no reason why they may not be trusted as indications of relationships.

In all the species of the subgenus *Cariacus* I find that the hair on the median line of the head is directed backward without interruption. In *Coassus*, on the contrary, there are in the median line two "poles," or points from which the hair radiates in every direction. One "pole" is on the crown, and the second about midway between the eyes and the rhinarium. In front of the second pole the tips of the hair are directed forwards to the nostrils. In *C. clavatus* the arrangement is that of the subgenus *Cariacus*, the tips of all the hairs in the median line of the face being directed backwards without interruption.

From the facts adduced it is, I think, proven that our new deer must be regarded as a species of the subgenus *Cariacus*, with simple horns. We may, therefore, consistently omit all further comparisons with the various species of *Coassus*. There is, however, one species with which our new deer might be thought to have close relationship, or to be identical. This is the *Cervus capricornis* of M. de Saussure, described in the *Revue et Magasin de Zoologie*.\*

The substance of M. de Saussure's account of this Mexican deer is briefly as follows: While hunting he saw, but did not obtain, a deer of about the size of *C. mexicanus*, armed with large, curved spikes. He at first considered this to be a young Mexican deer, but was afterwards informed by the native hunters that it was well known to them under the name of *Venado cuernicabra*. They also stated that it was rare, and that it never had branched antlers. Before leaving the country he obtained a single right antler, with a portion of the skull attached, which he believed to belong to this species.

His description of this antler is as follows: "Il mesure 0<sup>m</sup>, 200, selon la corde de sa courbure; il est très-divergent, très-arqué, et n'a qu'une seule courbure qui regarde en haut et en dedans; sa base est très-noueuse, sa couronne médiocre, et la seconde moitié de la corne est comprimée, assez épaisse. De plus, ce bois n'est pas grêle, comme les dagues des jeunes; il a plutôt le caractère de la vieillesse."

That this antler did not belong to an individual of our *C. clavatus* is, I believe, quite certain. The terms "très-divergent" and "très arqué" do not apply to the antlers of our species, but to the dag-antlers of *C. virginianus* and other species of *Cariacus* with branched horns. Further-

\* 2nd ser., XII. 1-60, p. 252.

more, the length of the antler in a straight line is greater than that of the antlers of our oldest *C. claratus*. It is a matter of interest in this connection, that among the antlers in the collection of the National Museum is one from Orizova, which corresponds almost exactly to M. de Saussure's description, and furthermore has upon it the original label of the collector, bearing the words "*Venado cuernicabra*." This antler certainly does not belong to our *C. claratus*, but appears to be a dag-antler of the Virginia deer, of which we have many in the collection.

Our species differ from *Cariacus yucatanensis* (Hays) (= *C. acapulcensis* Caton), in the presence of a metatarsal gland, and in the size and form of its antlers. The latter species, according to Mr. Hays, does not change its color, which is not true of *C. claratus*. There is in the collection of the National Museum a male deer labeled *C. gymnotus*, which was presented by the Zoological Society of Philadelphia, and was supposed to have been derived from South America. It is not clearly distinguishable from *C. yucatanensis*, and also agrees in color with the gray form of our *C. claratus*. From the latter, however, it is distinguished by the absence of a metatarsal gland and by its forked antlers. It is also much darker on the face and back, while the insides of the legs are whiter. The hairs surrounding the tarsal gland are white, and the hair posterior to the navel has the points directed backwards, while in *C. claratus* they are directed forwards. The hoofs are black throughout in this specimen, but in *C. claratus* they are yellow horn-color at the extremity.

It seems to me improbable that *Cariacus toltecus* (Saussure) is identical with *C. yucatanensis*, but rather with *C. sartorii* Sauss. (= *Coassus rufinus* B. & P). But of this I desire to treat in a subsequent article. At all events none of these nominal species appear to have any close relationship to our *C. claratus*.

From the specimens in the National Museum it appears that the range of *C. claratus* extends at least from the province of Tehuantepec, in Mexico, to Costa Rica; but its presence in Yucatan, British Honduras, and Nicaragua has not been ascertained. There are no specimens from the Pacific coast of Central America, and it is improbable that the species occurs there.

Measurements of two mounted skins of *C. claratus*, in millimeters.

Catalogue No.	Locality.	Collector.	When collected.	Sex.	Height at shoulder.	Length of head:	Length of ear from behind.	Calcaneum to top of hoof.	Length of tail with hairs.	Top of front hoof to knee.	Depth of hind hoof in front.	Length of antler from behind.	Remarks.
16075	E. Honduras.	C. H. Townsend	1887	♂	732	246	130	312	299	199	37	88	Young.
16076	.....do.....	.....do.....	1887	♀	685	230	132	306	238	199	34	.....	Do.

Measurements of ten skulls of *C. clavatus*, in millimeters.

Catalogue number.	Locality.	Sex.	Greatest length of skull.	Basal-cranial length. (Hensen.)	Length of nasals.	Greatest width of skull (between lower rims of orbits.)	Length of orbit.	Height of orbit.	Length of upper tooth-row.	Length of lower tooth-row.	Tip of mandible to angle.	Angle to top of coronoid process.	Tip of intermaxilla to end of palate.	Greatest breadth of posterior nares.	Greatest diameter of pedicel of antler.	Length of longest antler from behind.	Postero-superior rim of orbit to base of antler.
*13058	Costa Rica	♂	264	234	83	114	40	40	69	77	193	104	164	24.5	26	104	44.5
†14212	do	♂	255	225	77	106	42	42	59	77	194	101	155	25	21	100	45.0
†13040	do	♂	252	224	73	103	38	41	64	74	190	97	156	27	26	63	30.0
†13032	do	♂	248	223	73	101	40	38.5	69	77	186	90	156	20	20	96	45.0
§22825	Eastern Honduras	♂	222	195	70	89	35	33	69	77	140	22	140	22	13	51	42.0
†13333	Mirador, Mexico	♂	193	166	53	83	33	31	51	55	140	71	114	21	10	.....	.....
†13334	Costa Rica	♂	191	166	49	78	32	30	46	45	137	64	114	.....	.....	.....	.....
†13485	do	♂	226	202	62	89	35	37	69	77	173	88	145	21	.....	.....	.....
§22829	Eastern Honduras	♂	215	194	66	85	33	35	69	76	171	86	140	22	.....	.....	.....
*13243	Costa Rica	♂	217	193	65	89	34	35	66	72	161	81	136	23	.....	.....	.....

\* J. C. Zeledon, collector.  
 † William M. Gabb, collector.

§ Dr. C. Sartorius, collector.  
 C. H. Townsend, collector.

..... Antlers diseased.